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ABSTRACT

A study in 1987-92 assessed the effects of changes in life course on work and careers. Interviews with 150 individuals who remained active or continued to work beyond age 65 showed lifetimes differing greatly from the traditional model. The combination of longer lifetimes and postponement of old age has created a new stage in adult life, a second middle age, and new opportunities. Almost half the group began their period of greatest creativity and productivity at about age 50. Some had three or more career peaks, at about 15-year intervals; others experienced a steady upward progression. None expected such a creative period at this age, but remained active because they enjoyed it. There was no single pattern to finding the most satisfying work; some began early in life and some much later. The study concluded that the urge to develop one's abilities is fundamentally biological, with a number of distinct patterns. This longevity revolution has revealed powerful contradictions in American attitudes about aging. In higher education the impact may be greater faculty persistence, or use of traditional retirement to pursue personal interests. Faculty longevity may come to be regarded as an asset. Continued faculty affiliation with an institution after retirement is recommended. (MSE)

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Longevity's Gift: A Second Middle Age

For this issue of Research Dialogues, *we asked social researcher Lydia Brontë, Ph.D., to describe the findings of her recent five-year study of 150 individuals, ages 65 to 102, who have continued to work, create, and thrive, regardless of their chronological age. Popular wisdom has held that adult life follows an invariable track, with expectations of old age and retirement in our 60s and an inevitable downhill slide after that. Dr. Brontë's work suggests that our nation's advancing longevity has created a new stage of healthy adulthood between the ages of 50 and 75 — a "second middle age" — and that the extra gift of time has created a new pattern of adult life: the "long career."*

Introduction

Congress's decision to end mandatory retirement for college and university teachers has made all of higher education think more seriously about what population aging means and how it will affect the future of our higher education institutions. This is not a simple subject, since life-course changes over the past fifty years have now transformed conventional ideas of aging.

In fact, it is no longer possible to think about the issue just in terms of aging. At a deeper level, what has happened during this century is not so much a phenomenon of "aging" as it is a tremendous increase in longevity. And the concept of longevity differs in many important ways from our traditional concept of old age.

These differences will undoubtedly have an impact on higher education — both on individuals and on their institutions. The academic world has already seen a certain rise in anxiety about the effects of outlawing mandatory retirement. Administrators, fearful of declining ability, worry that tenured faculty will stay for a lifetime while their corps of fresh-picked young scholars will shrink to a handful because no tenured positions are available for them. Faculty, on the other hand, are presented with the Hamlet-like question of whether to retire or not to retire. If they choose to step down, they must then decide when they should do so and what they will do next. The academic life was once a compact unit, complete in itself. Now the extension of longevity has given it time for an unanticipated sequel — in some cases, perhaps even two.

A Sequel to the Aging Society Project

In 1987, I began a search for insights about how longevity will affect individual lives. Fueled by five previous years of directing the Aging Society Project, a Carnegie Corporation-sponsored project founded and chaired by Alan Pifer, I was fascinated with the overall changes in the life course that have taken place during this century.

> *What everyone inevitably wants to know about a major new societal trend is, How is this going to affect me and my family? What does it mean to my life?*

It was a reasonable next step to want to know what the future might hold for individuals. The Aging Society Project had been chiefly policy oriented — an orientation that is, of course, important in any number of ways. But once the project was completed, I began to realize that we still knew almost nothing about individual life patterns in a long-lived society. And regardless of the value of the broad view, what everyone inevitably wants to know about a major new societal trend is, How is this going to affect me and my family? What does it mean to my life?

I think the answers will surprise you, as they surprised me.

First of all, I discovered that virtually everything we think we know about aging and longevity, drawn from the collective wisdom, is wrong. Not just outdated, not shifted or distorted, but wrong. Most of our popular wisdom

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about aging comes from earlier in the twentieth century, or in a few cases is even a carryover from the nineteenth — when short lifetimes were the norm and age 50 was considered elderly.

Just as the circa-1900 era is now a historical relic, charming and quaint, and just as we no longer use a horse and buggy for everyday transportation and no longer light our homes with kerosene lamps or gas jets — so those old ideas about aging are no longer valid. Yet we are still imagining our individual futures using ideas from horse-and-buggy days — and are almost totally unaware of it.

The transformation is difficult to absorb because all of us are taught from earliest childhood to expect that our lives will have a certain predetermined form, a pattern similar to that of our parents and grandparents and others in their age groups. We go to school, graduate, take up a job or career, marry and raise children, buy houses and go on vacations, do our jobs as well as we can — and then we retire at 65.

At that point (the fable goes), we are old. Our interests will be diminished; we will concentrate on friends and family, on tending our own gardens. We hope to be spared the cumulative decline of aging, the headlong descent into sickness and death. But we silently expect and fear that cumulative decline will catch up with us anyway.

A New Understanding of Aging

My survey of the most up-to-date research on aging, which accompanied my own study of 150 over-65 survey participants — the Long Careers Study — turned up some surprising and encouraging facts.

First, much of the popular wisdom about aging is based on research that was done around the 1950s, when the field of aging was in its infancy (if you'll pardon the pun). Society at that time was quite biased against older people, and that bias worked its way into the basic research — as a priori assumptions on which the research was constructed — so that the results, not surprisingly, confirmed and reinforced existing bias.

One example is the belief that as we grow older, we all lose our mental abilities. As it turns out, a psychologist at Pennsylvania State University, Professor K. Warner Schaie, has now determined that we don't necessarily lose our mental ability as we grow older. The earlier results were a figment of the scientific method — specifically, of averaging.

Aging has had a much worse rap than it deserves — and we have a darker picture of our future than is realistic.

Scientists have long followed the practice of averaging the results of quantitative studies. One of the most important findings of Schaie's Seattle Longitudinal Study is that averaging gives inaccurate results when tracking a group's performance over time.

For over thirty years, Schaie has been following a mixed-age group of 1,200 Seattle, Washington, residents, who are periodically retested. Of those who have reached age 80, he says, roughly 75 percent have no mental impairment. Twenty-five percent *do* have some degree of mental impairment — because they are ill.

If you take these two groups and represent them individually on a graph, the first group of healthy individuals will be designated by a line that is almost straight horizontally, or still ascending, somewhat. The second group, those who are ill, will be indicated by a line descending sharply from left to right. Now, these two lines are very clear in their message: One is stable or continuing to rise, and the other is "going downhill."

But what happens if you average the two groups together? The resulting line will fall between the two, and it will have a downhill slope. The impression given is that everyone in the study group is declining steadily. In reality, the milder downhill curve is an artifact of the averaging process, and it is misleading. It does not describe any actual members of the group, or even a real subgroup. It is a fiction produced by the averaging process. But it gives the clear impression that *everybody* is declining mentally — whereas 75 percent of the group was doing just fine, thank you very much.

Obviously, the reported decline is not correct. Nevertheless, that is the kind of result that was produced in some early studies both of mental and of physical functioning. Consequently, aging has had a much worse rap than it deserves — and we have a darker picture of our future than is realistic.

Another fascinating aspect of Schaie's research is that the healthy 75 percent of the age-80 group had over time actually improved their mental functioning in some respects. They were able to make far more complex speculations about a hypothetical situation given as a test; they were less prone to cut-and-dried solutions than younger people; and their decision-making ability was better. Schaie calls this collection of characteristics "crystallized intelligence." To the ordinary ear, however, it sounds suspiciously like old-fashioned "wisdom." Other scientists, such as Germany's Paul B. Baltes, are now studying this increased sophistication and complexity of intellectual process, trying to determine how it develops and why.

The Seattle group's healthy 80-year-olds had slightly slower reaction times, and they were less able (or perhaps less willing) to perform well on the less intrinsically interesting parts of the test. But the increase in wisdom more than made up for that.

As for the declining 25 percent, their mental impairment was caused by specific illnesses. Schaie found that the most prominent cause of mental decline was cardiovascular disease, which prevented the brain from being sufficiently nourished and oxygenated.

Take another example — in this case, the extensive study of public safety officers that convinced Congress to rescind

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mandatory retirement for these professionals in the fire, police, and emergency services.[3] The psychologist chosen to conduct the Congressionally mandated study of public safety officers was another Penn State psychological researcher, Dr. Frank J. Landy.

Of course no one knew in advance what Landy would find, although I think everyone believed he would find that people 60 and older are not as able as those under 60. Again, that was a wrong guess.

Landy found that chronological age in and of itself was not a predictor of physical fitness — or of general fitness to be a public safety officer. Some of the officers in their 60s, the tests showed, were more fit than some of the officers in their 40s. Both kinds of fitness seemed to be a very individual thing.

Moreover, Landy found that the more mature officers performed differently and served functions different from those of the middle-aged and younger officers. They mentored younger officers; they backstopped decision making in their departments, having more experience to draw from; and they were quicker in emergencies to think through a situation and come up with an effective plan.

How old you are when you start a given career doesn't matter. What matters is your native ability for the career, your interest in it, and an environment that permits you to function well.

Creativity is another area where reality contradicts received ideas about what older people can do. Dr. Dean Keith Simonton, a professor of psychology at the University of California at Davis, has conducted a series of research projects over the past fifteen years that show creativity is a lifelong personality trait.[4] If you're very creative, you'll be that way at every stage of life; it's part of your makeup. All of us, of course, are creative in some ways. It's just a matter of finding the right vehicle.

As far as creative output is concerned, Simonton has found that it follows roughly a bell-shaped curve, with sometimes a burst of final production in the last years of life. It is the total quantity of production that appears to matter most: Highly creative people produce the most, but only a percentage of their output is of the best quality; the rest is ordinary or mediocre. The more one produces, the larger the high-quality output will be.

One of Simonton's most unexpected findings is that if you start a new career, regardless of how old you are, you progress through this same bell-shaped pattern, just as you would if you entered that career fresh out of college. This suggests that if you feel you're running down in the career you've been in for a long time, the best way to revive yourself is to start another career in a different area.

Essentially this also means that how old you are when you start a given career doesn't matter. What matters is your native ability for the career, your interest in it, and an environment that permits you to function well. Further, an adult who goes into a particular line of work may succeed much faster than a new college graduate could, because his/her experience in other kinds of work is transferable to some degree.

This finding was also exemplified by the experience of the five women in the Long Careers Study who stayed at home for twenty or thirty years to raise their children and then reentered the workforce after the age of 50. All of them did very well in their post-50 careers, and all of them achieved success much more quickly than might have been expected.

However, even these very positive research results did not prepare me for the findings of the Long Careers Study, when I began to evaluate the life-history data from the study.

The Long Careers Study

Over the period 1987-1992, I interviewed 150 persons who remained active or continued to work beyond the age of 65. I chose work or work-like activity as one criterion because it showed both a reasonable level of physical health and a continued engagement with life. I also interviewed approximately twenty-five experts in the field of aging, some of whom were not themselves old enough to be included in the study.

These participants were not a scientifically random sample, since there wasn't an easily accessible database for people over 65 who are still working (or volunteering). In fact, not many people over 65 who were still working were really supposed to exist — or, at least, not very many of them.

Instead, I had to settle for a *genuine* randomness. I had to find for myself all the people who would be interviewed. Nevertheless I was able to make up a group that was varied and interesting: Half were celebrities or high achievers, chosen for their role-model value, and half were more-or-less ordinary people, some with advanced degrees and some with only elementary or high school educations. The members of the study ranged between ages 65 and 102, somewhat skewed toward the older decades, including three centenarians and fourteen in their 90s. The group was 57 percent men and 43 percent women — not up to the current population ratios but better than most other researchers have managed.

In interviewing this diverse group of people, what I found were lifetimes that differed greatly from the expected traditional model. There was no one in the study whose life resembled the "typical" pattern. Instead of one pattern, there were many. Apparently, as we live longer and reach ages of greater maturity, a larger number of career and life patterns are possible. Indeed, this makes sense: Gerontologists have long known that as we grow older we become more individuated instead of more alike.

In our century, the longevity revolution has added almost thirty years to the expected length of American lifetimes. In less than one hundred years we have

doubled the length of adulthood. We may not have nine (adult) lives yet, like the proverbial cat — but we do have two. If average life expectancy moves up to or past 100, some of us will have almost *three* circa-1900 adult lifetimes: 20-50; 50-80; and 80-110.

Analysts' first impression when lifetimes began to lengthen was that this extra time was added to old age, like a cosmic game of pin-the-tail-on-the-donkey. Instead, as the life course has expanded, the whole life span has stretched — much as a rubber band expands through its entire length rather than on one end or the other. In effect, the extra time has been added to middle age, rather than to old age.

As lifetimes have lengthened, physical old age has been increasingly delayed. People now stay physically vigorous at much older ages than in our parents' and grandparents' generations. The chances are that your grandparents really were old at 50. Certainly all three of my own grandparents who were alive when I was a child were old at 50. Their aging wasn't just a trick of dress or hairstyle; they looked and moved and behaved as if they were old, and both they and the people in their community thought of them as old.

A Second Middle Age

The combination of longer lifetimes and the postponement of old age has created a new stage in adult life that never existed before as a general experience for large numbers of people. In the Aging Society Project, Alan Pifer and I called it "the third quarter of life," because it seemed to occupy roughly the period between ages 50 and 75.

However, by the time the Long Careers Study was under way, it was already clear that that was too narrow a time frame. Some of the people I interviewed were still in the "third quarter of life" in terms of their physical and intellectual activities in their 80s, and a few into their 90s. We had inadvertently foreshortened this new period of midlife vitality by assuming that it would end at 75. In response to this, I chose a name for this new period that does not carry any inherent sense of precisely when it ends: the Second Middle Age.

The existence of this new stage of adult life will give many of us thirty or more additional years as functioning, middle-aged adults, from age 50 onward. This means three or more decades of having to figure out what-to-do-for-the-rest-of-my-life, probably not once but several times. We will be able to take advantage of a range of experiences that were unimaginable to our grandparents: In a time-starved society, some passing fairy godmother has heard our prayers. We need more time, and we will get more time. It's just that we don't get the extra time today; instead, it will be there for us at 70 and 80 and 90.

This is a radical change from the old retirement-at-65 scenario. In many respects it is completely incompatible with the old model. That is one major reason why the shift is so confusing to us. In the old model, the career line rises until around 50, plateaus or moves slightly downhill until the early 60s, and then declines sharply as it approaches 65. The most creative period of life in this model, we've been told, is 30 to 45, unless you're a mathematician — in which case it's 20 to 35.

The paradox is that during the past twenty years, as longevity has increased and we were becoming more aware of it, the corporate and business worlds have been going retrograde — retiring people earlier, at younger and younger ages.

Common sense tells us that in a society where people grow old and begin to decline or die after the age of 50, as we did in 1900, there aren't many other choices about when to have your most creative period. Age 30 to 45, plus or minus, is all you've got.

Diverse Life Patterns

But when you have the equivalent of two adult lifetimes, rather than one, the entire range of possibilities changes. This was amply demonstrated in the lives of the 150 participants in the Long Careers Study. The most pronounced pattern was that almost half the group started their period of greatest creativity and productivity at around the age of 50.

This is a totally unexpected finding, and one that offers us a universe of tantalizing questions for researchers to explore. Having more time appears to make a difference not just in quantity, but in quality as well. The people who experienced this age-50 creative growth spurt traveled far on it; for the majority of them, it lasted until 75 or 80, and in some cases longer. A few have carried it into their mid-80s and are still "going strong."

This age-50 creative flowering is so different from the old model that it seems almost alien. The paradox is that during the past twenty years, as longevity has increased and we were becoming more aware of it, the corporate and business worlds have been going retrograde — retiring people earlier, at younger and younger ages. Now "early retirement" is generally pegged at about 50 or 55 (although I have heard one instance in which a company offered an "early retirement" plan beginning at 48).

In addition to the age-50 creative growth spurt, there were other atypical career patterns in the Long Careers group. Some people had three or more career peaks, at about fifteen-year intervals: a peak in their early 40s, another in their mid-50s, and another around 70. A university teacher, Dr. Laurence Wylie, was a model for this pattern. In his 40s, he achieved a wide reputation as a teacher of French language and civilization. Later he decided to take courses for an advanced degree in anthropology; with this training, he went to live for a year in a French mountain village and wrote a classic book on French village life, *Village in the*

Vaucluse. In his 60s he began doing serious work on integrating nonverbal language instruction into the teaching of verbal foreign languages.

Others in the study had no clearly defined "peaks" but just a steady upward progression, culminating in a great flowering of creativity in their 60s and 70s. For example, the career of U.S. Representative Millicent Fenwick seemed to peak when she was elected at age 64 to her first term in Congress. This high point lasted until her mid-70s, with Congressional service followed by a term as U.S. ambassador to the United Nations Food and Agriculture Commission in Rome.

Then there was a small percentage of people whose major creative period started at 65 or after — examples such as Maggie Kuhn and Dr. W. Edwards Deming. (There were also less well-known examples in all categories, of course.) Kuhn was a perfectly ordinary church employee, an organizer, until she was involuntarily retired at the age of 65. Her anger, shared by a cluster of friends in similar situations, stirred her to put together a group that evolved into the activist Gray Panthers. Deming, an expert in quality control and management, contributed to the efficiency of American military production in World War II and then to the postwar Japanese industrial recovery. He continued with an active consulting practice and teaching right up to his death at the age of 93 in 1993.

None of these people expected to have a major creative period at such an unlikely age. They remained active because they felt like doing so and followed the opportunities that presented themselves, or the ideas that came to them.

Just as there was no general rule as to when a person's period of greatest creativity came, so there seemed to be no one "right" way of finding the right kind of work. A small percentage, mostly creative artists and scientists, seemed to be born knowing what they wanted to do, making decisions about their careers at ages ranging from 2 1/2 (actress Celeste Holm) to 7 or 8 (chemist and two-time Nobel prizewinner Linus Pauling). Others, on the other hand, had absolutely no early inspiration about a career, or had inspirations that turned out to be for work they couldn't stand in reality. They had to go out and actively *find* what they wanted to do; a few needed twenty-five or thirty years to locate their right work.

There were some people whose youthful work laid cornerstones for the development of new fields and professions. Their long lifetimes enabled them to see the fruition of their work over time, in a way that was enormously satisfying.

Edward Bernays, the founder (in 1919) of the field of public relations, lived to see his one-person bright idea grow into a large profession, with some 150,000 practitioners in the U.S. alone. In honor of his 100th birthday, Northeastern University held a major symposium attended by members of the profession from all over the country.

We have the ability to continue growing and developing far beyond what we've believed is possible, without reference to chronological age.

Dr. Irving Wright, the first physician to use an anticoagulant on a living human patient (in 1938), unknowingly laid the foundation for modern surgery, including transplants, bypasses, and microsurgery — all of which depend absolutely on the ability to keep blood from clotting so it can be rerouted during an operation. Wright also provided the basis for treating millions of cardiovascular patients, for whom heparin and other anticoagulants are now routinely used to prevent strokes and heart attacks. And the organization he founded in 1982 with one penny — the American Federation for Aging Research (AFAR) — has received millions of dollars in foundation grants and is now a key provider of fellowships for young scientists in the field of aging.

Such experiences show that in a long lifetime there is no one way that is right for everybody, and there is a great potential for a large variety of career patterns, including late careers that would have been impossible in prior eras. There can also be satisfactions in later careers that override physical illnesses or disabilities.

There are as yet no explanations for this variety in career patterns. Perhaps in a long lifetime, some kind of biological sequence is activated that is allowed to switch on only if the unconscious mind knows it will have enough time to run another long program. Perhaps this means that we have the ability to continue growing and developing far beyond what we've believed is possible, without reference to chronological age.

My own sense, after years of research into and familiarity with the lives of older people, is that the urge to develop one's abilities is of a fundamental biological nature, such as posed by the psychologist Abraham H. Maslow in his theory of the hierarchy of human needs.[7] In the presence of longer lifetimes, we can be even more effective in creating something new or better to leave behind us, and that is a drive that stays with us to the end.

The Fall of Cumulative Decline

One might still be skeptical and ask how this can be possible, when at some point most of us will become ill and frail as we grow older. These aspects of the older years have been so heavily emphasized that many Americans think a large percentage of the over-65 population at any given time is institutionalized.

Happily, this is not true. Far from it: According to data collected in the late 1980s on people 65 and over, 77 percent have no impairment and 13 percent are moderately impaired from doing normal daily activities; only 10 percent are severely impaired or are residents of nursing homes.[8] So for the most part, those age 65 and over are essentially normal adults, just a little bit older than the other normal adults.

During the Long Careers Study it became clear that cumulative decline is not the only possible model of physical aging. As a first model, identified by physicians, who see mostly ill older people, it understandably emphasized illness. In fact there are at least three other models of physical aging.

One pattern, the "plateau of healthy aging," was first observed and described by Dr. James E. Birren, the founder of the Andrus Center of Gerontology at the University of Southern California and now a member of the Center for Aging at the University of California at Los Angeles. Over the years he encountered a number of people who at fairly advanced ages were healthy and energetic. He made notes on his contact with them and kept track of them to see how their functioning might change. To his surprise, he found that they did not experience any major change in functioning. At the end of life they would have either a very short illness, or no illness at all. One, for example, felt "tired" for several months before she died at 104, after seemingly never having been tired in her life.

We do not know what percentage of older people can be grouped in this model and what percentage comes under cumulative decline. In the Long Careers Study to date, about the same number and percentage have followed the plateau pattern as have experienced cumulative decline.

Birren's new model raises an intriguing possibility: Perhaps the plateau model is the more authentic pattern of normal aging. We have become very accustomed to associating "aging" with "sickness"; however, it may be that many illnesses associated with aging are preventable, and some are perhaps the result of lifestyle choices that we do not currently identify as harmful.

The two other, minor patterns of aging observed in the Long Careers Study were noted in only a few people. They were the "episodic" pattern, in which periods of illness were followed by complete recovery, and the "ill but functional" pattern, in which people achieved a stable state of functioning despite a chronic illness.

Longevity and Values

The longevity revolution has brought to light some powerful contradictions in American attitudes about aging.

Without being aware of it, we have confused aging (in human beings) with obsolescence (a property of machines).

One curious element is that during the course of this century we appear to have reversed our belief in the value of experience. Endless generations of human beings have adhered to the idea that experience is valuable; that knowing how to do something is as important as knowing *what* to do; and that practice improves one's skills. A medical student may know that a patient needs a coronary bypass, but the patient will be successfully treated only if an experienced person can be found who knows *how* to do the operation. As the owner of a word processor, I may know that some feature of the machine needs to be repaired. But because I have no idea how to repair it, I will be immobilized in this situation until I can find an experienced repairman.

These are particular examples chosen to illustrate a more general phenomenon. Regardless of the youth wave of the '60s and '70s, most people would still greatly prefer a qualified heart surgeon for their bypass operation, and an experienced auto mechanic to repair their ailing automobile. It is "experience" *as a general concept* that has been devalued. The word itself has acquired a new connotation, that of "obsolescence." This is a transformation that had certainly not yet taken place in the '50s, when General Eisenhower was elected president precisely because he had major command experience in wartime — at a time when America was feeling menaced by North Korea and the Soviet Union and fearful that the cold war would become a hot one.

Yet even if we cannot pinpoint the moment when this shift took place, we can nevertheless describe it. It seems to me that without being aware of it, we have confused aging (in human beings) with obsolescence (a property of machines). Drawing an analogy to literary criticism's "intentional fallacy," we can call it the "mechanical fallacy."

Unconsciously, we have come to assume that a human being is *like* a machine, or in the most extreme form, that human beings *are* in fact a kind of machine. It is a very widespread perspective in our society today, and it is part of the basis for much of the current chaos in the workforce.

The mechanical fallacy was given great momentum by the Industrial Revolution and by our fascination with the machines that we ourselves had invented. It was intensified during the early decades of the twentieth century, when a new army of machines enabled Americans to do an enormous variety of marvelous things: to drive around without horses, to light homes without fire, and to own a variety of laborsaving machines. Henry Ford's assembly line gave the concept even more power. The number-one question, to paraphrase Henry Higgins, was no longer, "Why can't a machine be like a man?" but, "Why can't a man be more like a machine?"

Machines contributed a vast array of new possibilities to human life. They went beyond the range of human capacities in ways that promised great future achievements. They could cross great distances far more rapidly than any form of animal conveyance, manufacture objects quickly and inexpensively, and were easy to repair. They were also easily replaceable: If one broke down, just buy another. Human beings, on the other hand, were pretty much what they had always been — self-conscious, emotional, and to some, often more trouble than they seemed to be worth.

World War II magnified our national fascination with machines because of the need for more and more war materiel. When the war was over, we began racing to create even more sophisticated machines for consumer use. And then

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Sputnik in 1957 launched a technological revolution. Since then, our inventiveness has transformed American life. Somewhere in this process we began to confuse what is mechanical and what is human in a way that is affecting our society very adversely.

In one sense, a machine is a device that replaces human labor. Yet machines are manufactured by human beings, and they are designed for a specific purpose or purposes. They will generally perform only the purpose(s) they are designed and built to perform, and no others. A television set can draw television signals from the atmosphere and translate them into pictures and sound. A microwave oven cooks food; a dishwasher washes dishes. You cannot wash your dishes in a microwave, any more than you can receive television images on a dishwasher's front surface. And you cannot cook food on a television set.

Human beings, by way of contrast, are *organic life forms*, the product of nature, not of manufacturing. Instead they are "conceived" by the union of two tiny, microscopic cells, which together contain all the patterning necessary to create a mature adult human being, given the right environmental circumstances over the years. Once conception has taken place, human beings grow and develop. They mature organically, in a process that takes a long time (as any parent knows all too well). What humans eat and drink and learn all becomes part of their organism.

Machines of a particular type are all alike, but human beings are all different — biologically as individual as snowflakes. All humans have the same general form, but within that form, literally billions of variations are possible. Machines always function the same way; human beings do not. Humans can achieve optimal flow and produce works of genius; they can also get sick, rebel, or just simply sit down on the job.

Every human being acquires experience and information as he or she lives, starting with the moment of birth. This experience and information can generally be accessed by using ordinary conscious memory. As we get older, we have more memories to access and more experience to draw on. We have creative abilities that mature and expand as they are exercised and as we grow older.

The first version of a machine is usually followed by successive models. The manufacturer tries to improve the machine with each new model by adding new features. In the technological revolution that has occurred since World War II, the computer has gone from a contraption so enormous that it filled an entire Quonset hut to a small rectangle the size of a paperback book that can be held in the palm of one hand and used to carry your address list and daily schedules. The more models a machine has gone through, usually the faster the pace of innovation has become and the more sophisticated the most recent model will be. In technology, we have thus established the principle that the *newest* version of a thing is ordinarily the *best*, and this has become widely understood. (Occasionally it isn't true, but for the most part it is.)

The assumption that the newest model is the best may be appropriate for machines. But it is not appropriate for human beings. Every human being has to acquire knowledge and skills through experience. Experience does not replace creativity or negate it: Rather, it enhances innate abilities and allows them more skillful expression.

Long Lifetimes and Higher Education

What will longer lifetimes mean for higher education? There will undoubtedly continue to be some unrest about long-lived faculty who remain in teaching positions beyond their prime. However, it is also likely that many faculty will choose to go ahead and retire at approximately the same age as would previously have been the case, so they will have time to follow their own interests instead of being tied to a teaching schedule.

It is also possible that longevity will come to be regarded as an advantage, rather than a handicap, and that older faculty may even become acknowledged assets. Learning about World War II from someone who actually lived through it, for example, is very different from reading about it in books. The opportunity to study with a person who was present at the beginning of a discipline and has had a long and continuous knowledge of that discipline can, moreover, give students a comprehensive perspective that cannot be obtained in any other way. This is true right now in the field of aging, when many great researchers are still alive and active who helped shaped the field itself after World War II: people such as Dr. James E. Birren (UCLA), Dr. Bernice Neugarten (University of Chicago), and Drs. John and Matilda Riley (Washington, D.C./National Institute on Aging).

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Universities can make it easier for mature faculty to make their own retirement decisions by allowing them to continue an affiliation with their university once they step down from regular teaching — by appointing them to a senior research institute, for example, or by allowing them to continue applying for grants to support their own research.

We should also realize that the existence of a large population of active, intellectually lively, mature adults may constitute a new student group for universities and colleges. Many individuals will want to learn new skills and perhaps even to acquire new professions — such as Long Careers Study participant Evelyn Nef, who in her 60s went back to school and trained as a psychotherapist. Now in her early 80s, she is still in demand for her considerable skills as a therapist and has begun writing her autobiography.

The gift of longevity offers all of us more potential, not less. It is high time that all of us, academics and lay persons

alike, stopped seeing longevity as a potential catastrophe and started thinking of creative ways to use this unexpected, but quite wonderful, gift of a longer lifetime. ❑

Endnotes

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